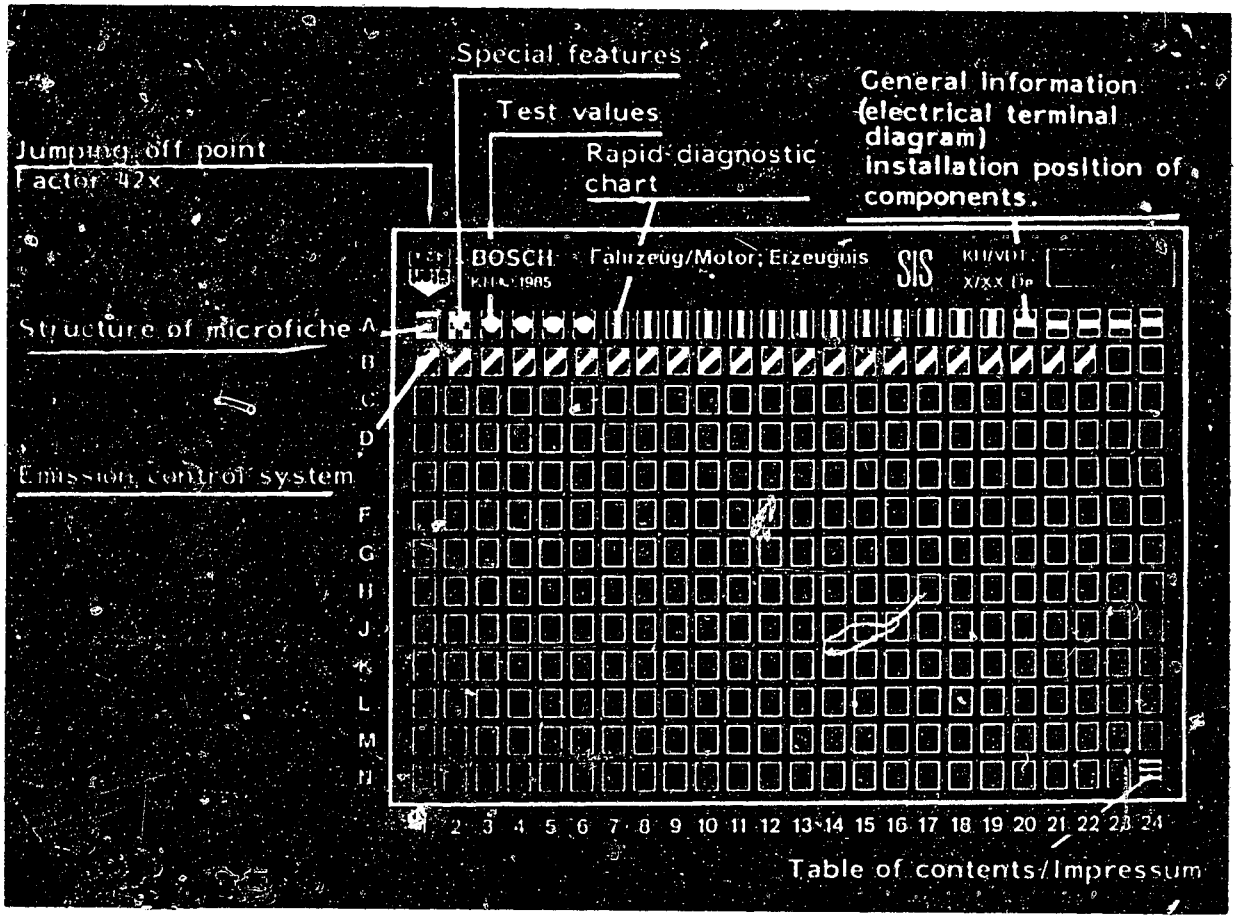
Structure of microfiche (brief instructions)



1. Read from left to right

2. Title of microfiche (appears on each coordinate)

E16	Product/component/test step Vehicle/engine

Coordinate

3. Limits of section

Beginning	Mid-section	End	One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

A1

1. Special Features

1.1 Idle-speed control. Control electronics integrated in KE-control unit.

1.2 New electronic engine-speed relay with the following functions:

- Actuation of electric fuel pump.
- Actuation of start valve dependent on battery voltage, coolant temperature, starting signal. For example, switching duration at -20°C approx. 10 s, at shorter starting time correspondingly shorter. Does not function above approx. +60°C. Thermo-time switch eliminated.
- Kickdown cutoff (automatic trans. vehicles) approx. 200 min^{-1} below rated engine speed.
  Note: Different relay design for vehicles with manual and automatic transmission.

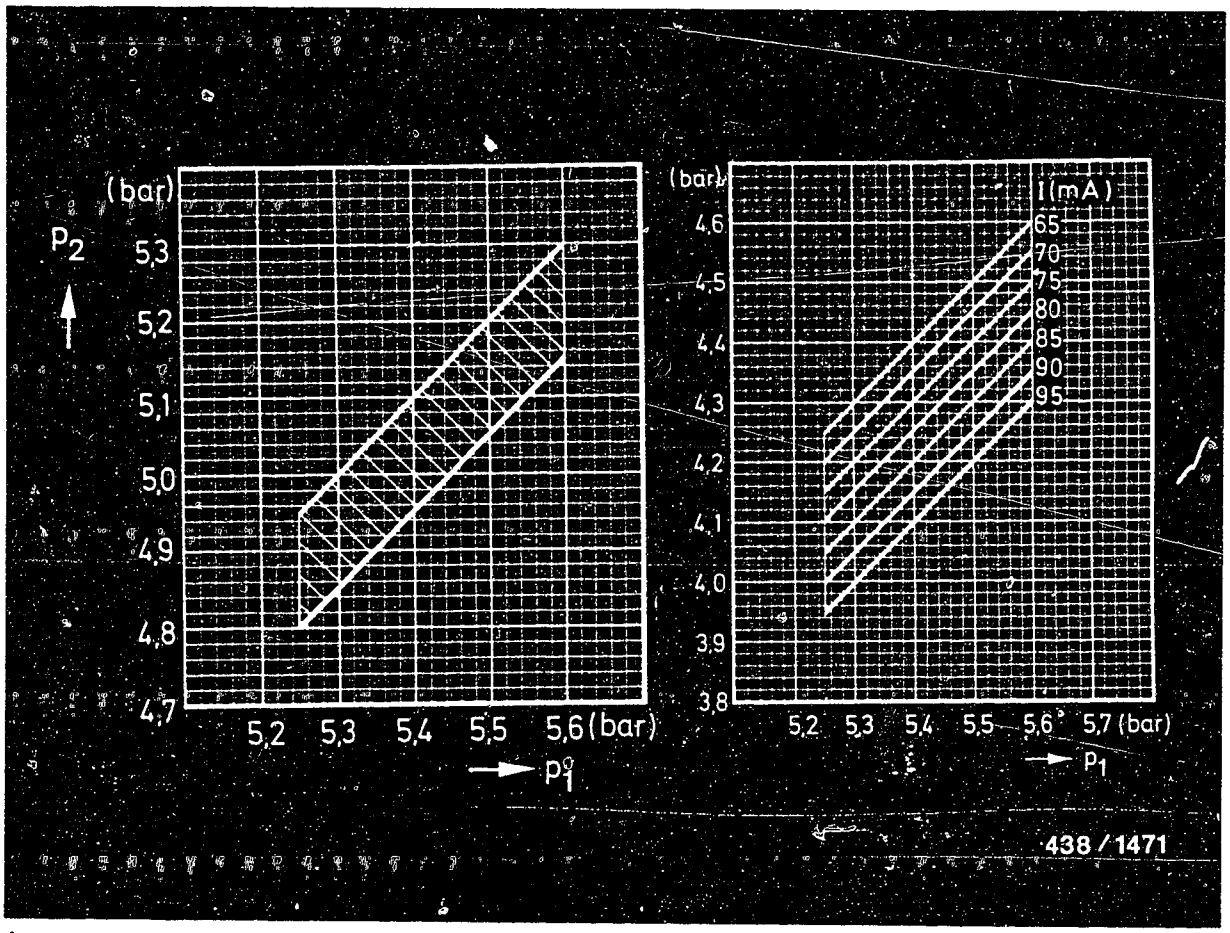
1.3 Engine speed limitation approx. 6200 min^{-1} by current reversion, as overrun cutoff.

1.4 Throttle-valve switch on vacuum control valve (near throttle-valve assembly) for recognition of idle and full-load operation.

1.5 Emission control system (exhaust-gas recirculation, secondary-air self-induction) (non-Bosch systems)

Remark:
Basic microcard for detailed trouble-shooting: MB-501

Important: When refering to a basic microcard, it should be noted that the test specifications should always be taken from the vehicle-specific brief instructions.



p_1 = Primary pressure

p_2 = Lower chamber pressure

2. Test Specifications

2.1 Differential pressure
(Primary pressure/lower chamber pressure)

Get nominal lower chamber pressure value "warm" corresponding to measured primary pressure from graph on left. Actuation current in this instance 0 mA.

Get nominal lower chamber pressure value "cold" corresponding to measured primary pressure and measured actuation current from graph on right.
Note: tolerance ± 0.15 bar.
The "cold" condition is simulated by detaching the lead plug on the temperature sensor (NTC).

2.2 Electric fuel pump

Fuel delivery: min. 1100 cm^3/min.

2.3 Primary pressure: 5.25 ... 5.6 bar (5.35 ... 5.7 kgf/cm^2)

2.4 Testing the fuel system as a whole for leaks:

Min. pressure after 10 min: 2.7 bar (2.8 kgf/cm^2)
Min. pressure after 20 min: 2.6 bar (2.7 kgf/cm^2)

2.5 Fuel-injection valves

Opening pressure: 3.0 ... 4.1 bar (3.1 ... 4.2 kgf/cm^2)

2.6 Fuel distributor

Comparative measurement of fuel deliveries:

Load range	Setting point	Max. allowable fuel delivery
Idle	6.0 cm^3/min.	6.6 cm^3/min.
Part load	40.0 cm^3/min.	42.5 cm^3/min.
Full load	100.0 cm^3/min.	109.0 cm^3/min.

Minimum delivery at all outlets with maximum deflection of air-flow sensor plate: 140.0 cm^3/min.

Flow rate for KE throttle in fuel distributor: 130 ... 145 cm^3/min.

2.7 Temperature sensor

Resistance tests:

Cold engine (+15°C...+30°C):	1300 ... 3600 Ω
Warm engine (approx. +80°C):	250 ... 390 Ω

2.8 Air-flow sensor - potentiometer

Sensor plate basic position voltage signal:	0.2 ... 0.3 V

2.9 Idle-mixture-adjustment screw - basic setting dimension

(Fuel distributor support - needle bearing):	21.1 ... 21.3 mm

2.10 Idle-speed adjustment *

Idle speed (controlled):	700 ... 800 min^{-1}
On-off ratio to be set:	27 ... 29 %
Idle-exhaust value (CO): (Secondary-air self-induction operative)	0.4 ... 1.2 vol.%

* Information for idle-speed adjustment:

In addition to the usual test equipment, the following are required:

- On-off ratio measuring instrument, e.g. Bosch Lambda Closed-Loop Tester KDJE-P 600 or Bosch Pocket Engine Tester KTE 001.03
- Bosch Universal Test Adapter ETT 018.01 with KE-Jetronic test lead 1 684 463 135.

KDJE-P 600 connection: directly to B+ and ground, blue test lead to red "V" socket on adapter. Press "IR" button on tester.

Pocket tester connection: yellow B+, green to red "V" socket on adapter. Switch setting: "100 % ⨘ ".

For on-off ratio measurement turn "V" switch on adapter to position 10.

Although idle speed is automatically controlled by idle-speed control, the on-off ratio for idle speed must be checked and if necessary corrected by setting the bypass screw on the idle actuator.

CO setting is accomplished as usual by setting the idle-mixture-adjustment screw in the mixture-control unit.

3. Rapid diagnosis chart for universal test adapter ETT 018.01 with KE-Jetronic test lead 1 684 463 135 and suitable multimeter

The following rapid diagnosis chart makes it possible for the experienced Jetronic expert to quickly check the electrical/electronic peripheral and control-unit functions of the KE-Jetronic.

Important notes on the following rapid diagnosis chart:

The "Test conditions" column shows for which test steps the control-unit plug must be connected or disconnected. Make absolutely sure that the ignition is off whenever connecting or disconnecting the control-unit plug.

The "Test connections" column provides information on the leads connected into the respective test circuit, referenced to the pin assignment in the control-unit plug.
Trouble-shooting, if necessary, refers to these leads.

In the following diagnosis chart, in addition to the peripheral and control unit functions of KE-Jetronic, functions and components of the exhaust-gas-recirculation system (EGR) are checked.
The test steps 1 to 5 required for this can not be carried out with the universal test adapter. The procedure to be followed in these test steps is noted in the "test conditions" column (measuring instrument connections etc).

Rapid Diagnosis Chart for Universal Test Adapter ETT 018.01

Test Step	Switch Position V	Switch Position Ω	Button	Object of Test	Test Connections	Test Conditions	Test Specifications (Reading)
1	–	–	–	Throttle-valve switch		Ignition off. Take apart triple plug (near mixture-control unit) between throttle-valve switch and EGR control unit.	
				– Idle		Ohmmeter connection at pin 1 and 2. Throttle valve slightly open:	0 ... 1 Ω
				– Full load		Ohmmeter connection at pins 2 and 3. Throttle valve closed:	∞Ω
						Throttle valve fully open:	∞Ω 0 ... 1 Ω
2	–	–	–	EGR control unit power supply		Disconnect EGR control unit from plug base. Voltmeter connection: Positive = socket 9, ground = socket 11 of base. Ignition on. Voltage reading:	8 ... 15 V
3	–	–	–	Cable set to EGR solenoid-operated valve		EGR control unit disconnected from plug base. Connect sockets 3 and 9 of base. Remove plug on EGR solenoid valve and connect to voltmeter. Ignition on. Voltage reading:	8 ... 15 V
4	–	–	–	Cable set to throttle-valve switch		EGR control unit disconnected from plug base. Voltmeter connection: Positive = Socket 10, Ground = Socket 11 of base.	
				– Idle		Ignition on. Throttle valve closed. Voltage reading:	8 ... 15 V
				– Full load		Voltmeter connection: Positive = Socket 8, Ground = Socket 11 of base. Throttle flap fully open. Voltage reading:	8 ... 15 V
5	–	–	–	EGR control unit functioning		Connect EGR control unit. Disconnect plug on EGR solenoid valve and connect to voltmeter. Ignition on.	
						Throttle valve closed:	8 ... 15 V
						Throttle valve in part-load position:	0 V
						Throttle valve fully open:	8 ... 15 V

Rapid Diagnosis Chart for Universal Test Adapter ETT 018.01

Test Step	Switch Position V	Switch Position Ω	Button	Object of Test	Test Connections	Test Conditions	Test Specifications (Reading)
6	↓	4	–	Pressure actuator internal resistance	12 – 10	Disconnect control unit plug	20 ... 30 Ω
7	↓	5	–	Temperature sensor internal resistance +15°C...+30°C: approx. +80°C:	21 – 2	Control unit plug disconnected	1.3 ... 3.6 kΩ 250 ... 390 Ω
8	↓	9	–	Idle microswitch (on throttle linkage)	13 – 2	Control unit plug disconnected. Throttle valve closed: Throttle linkage free-travel bridged:	 0 ... 10 Ω ∞Ω
9	↓	11	–	Control unit final stage ground	20 – 2	Control unit plug removed.	0 ... 10 Ω
10	3	–	–	Starting signal term. 50 – ignition lock (only with automatic transmission)	16 – 2	Control unit plug disconnected. Engage driving position. Briefly crank starting motor:	8 ... 15 V
11	4	–	–	Starting signal term. 50 – starting motor	24 – 2	Control unit plug disconnected. Briefly crank starting motor:	8 ... 15 V
12	5	–	–	TD signal (ignition)	25 – 2	Control unit plug disconnected. Crank starting motor for a few seconds:	Voltage undefined
13	6	–	–	Control unit power supply	1 – 1	Control unit plug disconnected. Switch on ignition:	8 ... 15 V

Rapid diagnosis chart for universal test adapter ETT 018.01 (continued)

Test step	Switch setting V	Switch setting Ω	Button	Object under test	Test connections	Test conditions	Test specifications (Reading)
14	7	-	-	Power supply to potentiometer on air-flow sensor	18 - 2	Connect control unit. Switch on ignition:	7 ... 8 V
15	8	-	-	Potentiometer signal on air-flow sensor	17 - 2	Control unit connected. Switch on ignition. Deflect air-flow sensor plate by hand, whereby voltage rise to max. 8 V	0 ... 8 V
16	10	-	-	Idle actuator power supply and continuity of winding 1	3 - 2	Switch off ignition. Disconnect control-unit plug. Switch on ignition.	8 ... 15 V
17	11	-	-	Idle actuator - continuity of winding 2	4 - 2	Control-unit plug disconnected. Switch on ignition.	8 ... 15 V
18	12	-	-	Air conditioner signal (if applicable)	19 - 2	Control-unit plug disconnected. Switch on ignition. Switch on air conditioner:	8 ... 15 V
19	-	-	1	Warm-up enrichment - 20° C	12 - 12	Current measurement! Connection of measuring equipment: Negative = black socket 1 Positive = black socket 2 Connect control unit. Switch on ignition:	41 ... 62 mA

Rapid diagnosis chart for universal test adapter ETT 018.01 (continued)

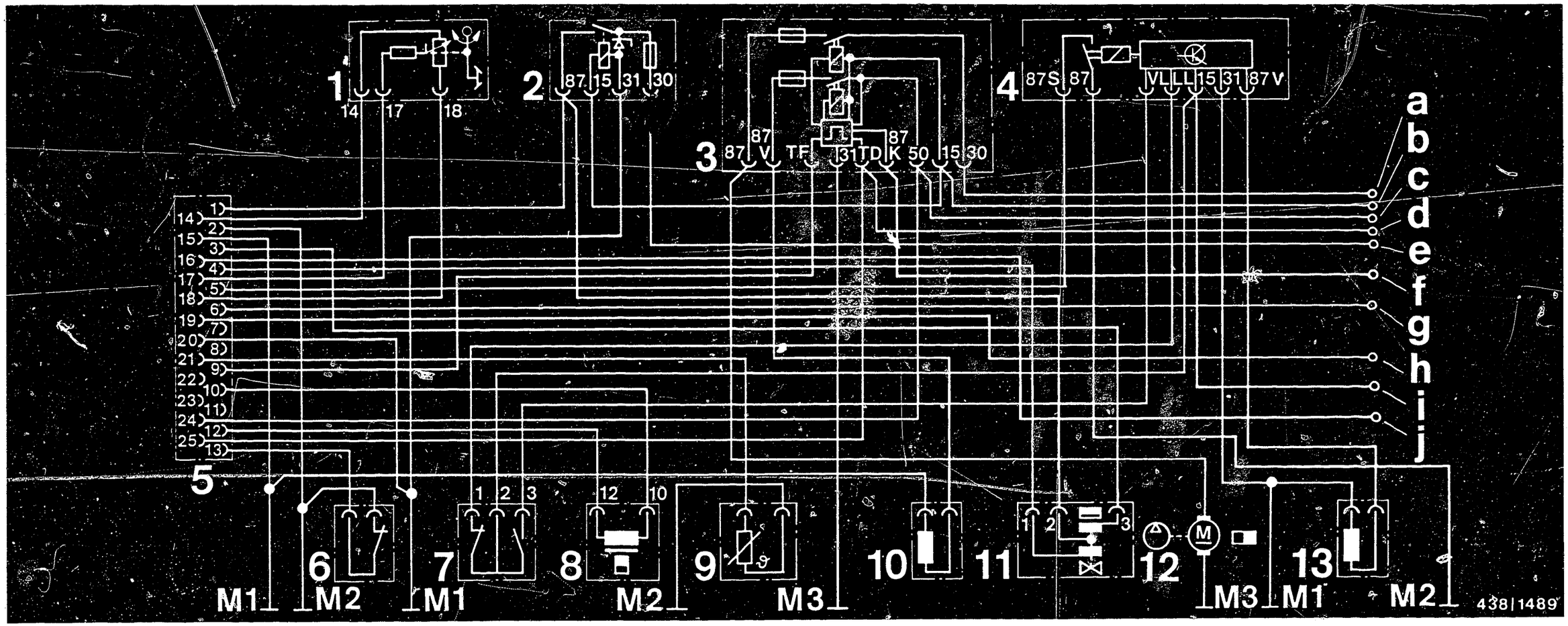
Test step	Switch setting V	Switch setting Ω	Button	Object under test	Test connections	Test conditions	Test specifications (Reading)
20	-	-	2	Actuator current corresponding to engine at normal operating temp.	12 - 12	Control unit connected. Switch on ignition:	0 ... 1 mA
21	-	-	2/4	Starting enrichment	12 - 12	Control unit connected. Switch on ignition. Press button 2 pressed. Then press button 4. Current rises to FD 451 from FD 451 Cut-back time:	120...150 mA 50... 70 mA approx. 1.5 sec.
22	-	-	1/4	Post-start enrichment	12 - 12	Control unit connected. Switch on ignition. Press button 1 and keep pressed: Press button 4. Current rises to: After a short period, cut-back (approx. 90 s) to:	41 ... 62 mA 80 ...125 mA 41 ... 62 mA
23	-	-	1/6	Acceleration enrichment	12 - 12	Control unit connected. Switch on ignition. Keep both buttons pressed: Rapidly deflect air-flow sensor plate by hand. Current rises to: Cut-back approx. 1.5 seconds to:	41 ... 62 mA 130...150 mA 41 ... 62 mA

Rapid diagnosis chart for universal test adapter ETT 018.01 (continued)

Test step	Switch setting V	Switch setting Ω	Button	Object under test	Test connections	Test conditions	Test specifications (Reading)
24	-	-	2	Overrun cutoff	12 - 12	Control unit connected. Change over terminals of ammeter. (Swap positive and negative; not necessary for measuring instrument with automatic polarity change-over.) Start engine and hold at approx. 2000 min^{-1}. With button 2 pressed, actuate idle throttle-valve switch by hand. Engine hunts. Current reading during the falling engine-speed phases: With cruise control (if applicable) on, there must be no overrun cutoff. In this case, after the cruise control has been switched on, positive (8...15 V) must be applied to pin 6 of the control-unit plug	-40 ... -50 mA
25	-	-	2	Full-load enrichment	12 - 12	Control unit connected. Take apart full-load throttle-valve switch connector and, on the control unit end, jump terminals 2 and 3. Start engine. Press button 2. Current reading at idle speed: Raise engine speed. As of approx. 1000 min^{-1}: As of approx. 1250 min^{-1} to approx. 2100 min^{-1}:	0 ... 1 mA Current rise 5 ... 7 mA

Rapid diagnosis chart for universal test adapter ETT 018.01 (continued)

Test step	Switch setting V	Switch setting Ω	Button	Object under test	Test connections	Test conditions	Test specifications (Reading)
26	10	-	-	Idle speed control	3	Test with on/off ratio tester, e.g.: Lambda closed-loop tester KDJE-P 600 or Bosch pocket motortester KTE 001.03 Connection of lambda closed-loop tester: Large clips directly to vehicle battery red +, black -, blue test lead to red "V" socket or test well of adapter. Press button "IR" on tester. Connection of pocket motortester: Yellow clip directly to vehicle battery +, green clip to red "V" socket or test well of adapter. Switch position on tester = "100 % ⊀ " Warm up engine and operate at idle speed. Idle speed (closed-loop controlled): whereby on/off ratio: If necessary, adjust on/off ratio (bypass screw on idle actuator) Switch on air conditioner (if applicable): Disconnect plug for throttle-valve switch idle (microswitch on linkage): Select drive mode (automatic transmission):	 700 ... 800 min^{-1} 27 ... 29 % 680 ... 780 min^{-1} 720 ... 820 min^{-1} (32...34 %) 640...740 min^{-1} (24 ... 26 %)
				Idle speed control correction functions			



4. Electrical Terminal Diagram with Electric Fuel Pump Safety Circuit

1 = Air-flow sensor potentiometer
2 = Electronic relay with over-voltage protection
3 = Electronic relay for actuating electric fuel pump and start valve
4 = Exhaust-gas-recirculation (EGR) control unit
5 = KE-Jetronic control unit
6 = Throttle-valve switch (microswitch on linkage)
7 = Double throttle-valve switch
8 = Electro-hydraulic pressure actuator
9 = Temperature sensor (NTC)
10 = Start valve
11 = Idle actuator
12 = Electric fuel pump
13 = EGR solenoid-operated valve

a = Term. 30, single plug-connection cable
b = Term. 15, engine cable set plug-connection cable
c = Term. 50, engine cable set plug-connection cable
d = Term. TD, diagnosis socket multiple butt connector
e = Term. 30, single plug-connection cable
f = Engine cable set plug-connection cable pin 9 - kickdown-switch socket 1
g = Cruise control plug-connection cable (only with automatic transmission)
h = Refrigerant compressor coupling, term. 3
i = Term. 15, rotor housing cable connector
j = Term. 50, ignition lock with automatic transmission or engine ground with manual transmission
M1 = Battery ground
M2 = Engine ground
M3 = Center-console ground

4.1 Bridging Electric Safety Circuit:

The safety circuit should be bridged for all pressure and quantity tests.

The safety circuit electronic relay (for electric fuel pump and cold-start control) is located in the equipment space (to the right as viewed in the direction of travel, behind the battery, protected by plastic cover), along with the over-voltage-protection relay, exhaust-gas-recirculation control unit, and KE control unit.

Remove relay from relay base for bridging.

Connect sockets 7 (87) and 8 (30) with 1.5 mm^2 connection lead and fuse element with fuse 16 A).

The electric fuel pump is thereby supplied with battery voltage.

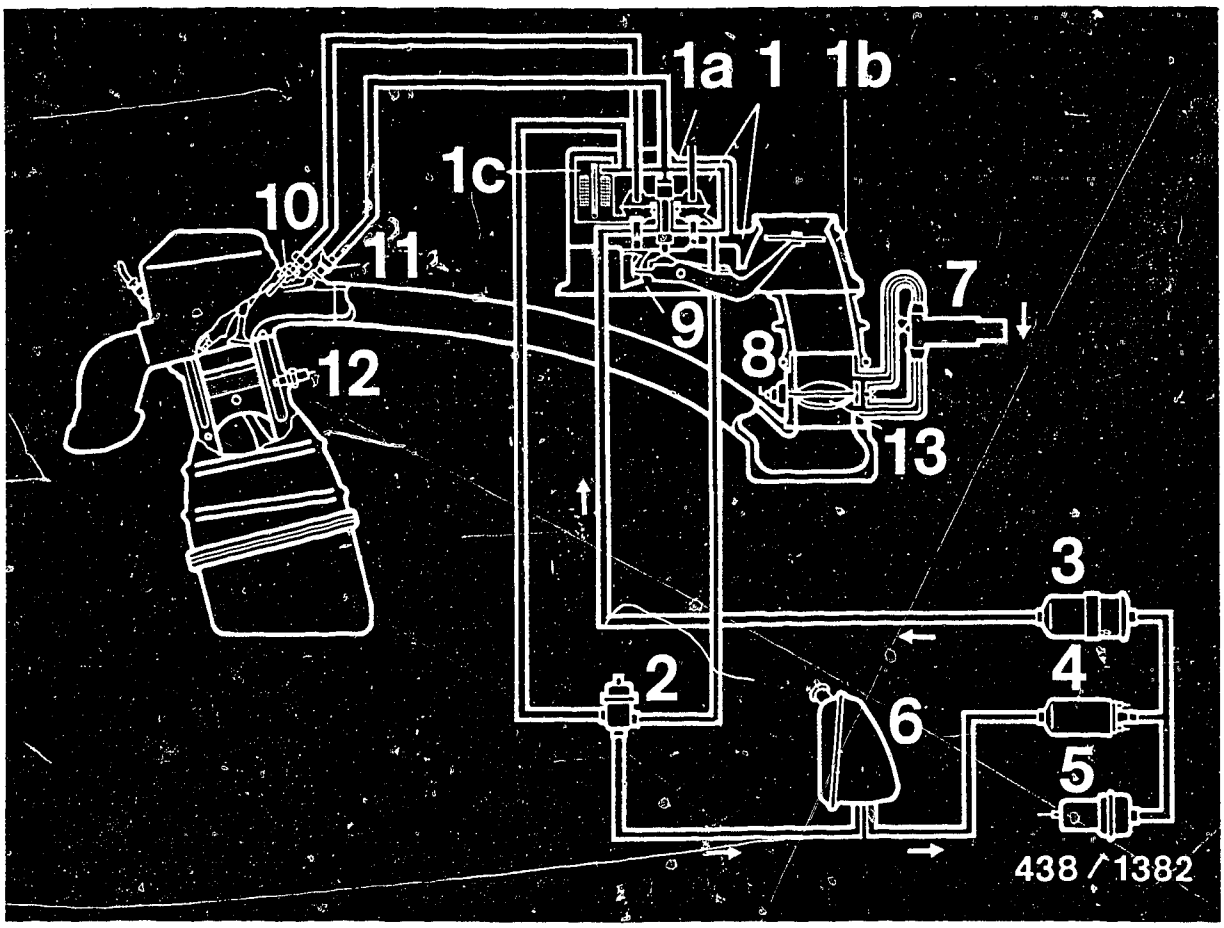
Important:

To test the control unit functions, it is sufficient to switch on the ignition.

In this case, the safety circuit must not be jumped.

This ensures that no fuel is injected when the air-flow sensor plate is moved.

This would lead to serious engine damage when the engine is subsequently started.



5. Fuel line diagram

1 = Mixture-control unit
1a = Fuel distributor
1b = Air-flow sensor
1c = Electrohydraulic pressure actuator
2 = Pressure regulator (primary pressure)
3 = Fuel filter
4 = Electric fuel pump
5 = Fuel accumulator
6 = Fuel tank
7 = Idle actuator
8 = Double-throttle-valve switch
9 = Air-flow sensor potentiometer
10 = Injection valve
11 = Start valve
12 = Temperature sensor (NTC)
13 = Throttle valve

6. Installation Positions of Components:

Mixture-control unit:	above intake manifold and throttle-valve assembly
Primary-pressure regulator:	between intake ports 1 and 2
Injection valves:	in flanges of intake ports
Electric fuel pump, filter, accumulator:	on vehicle floor on right before rear axle, protected by splashguard
Temperature sensor (NTC):	on cylinder head, single round-pin plug
Control unit, over-voltage protection, speed switch for safety circuit and cold-start control	in equipment space, on right behind battery, protected by plastic cover
Idle actuator:	between intake ports 3 and 4
Idle / full-load throttle-valve switch:	on throttle-valve assembly, throttle shaft
Idle microswitch:	on throttle linkage, in area before mixture-control unit.

The components of the emission control system are described in a separate chapter (beginnning on coorinate B1).

7. Emission Control System; Description of Operation

The emission control system consists of two individual systems:

secondary-air self-induction

exhaust-gas recirculation

When trouble-shooting in the mixture-formation system, the possible influence of both of these additional systems must be taken into account.

7.1 Secondary-Air Self-Induction:

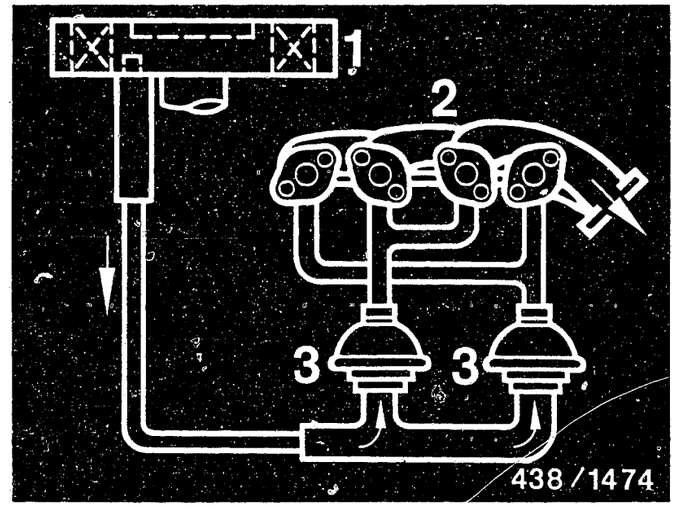
On the undersides of the 4 tubes of the exhaust manifold (2) are located fittings which are connected to 2 non-return valves (3) via distribution pipes. A hose leads from the non-return valves to the outlet side of the intake-air filter (1).

The high flow velocity of the exhaust gases in the exhaust manifold together with pulsation (pressure fluctuations) cause alternating overpressure and vacuum in the distributor pipes.

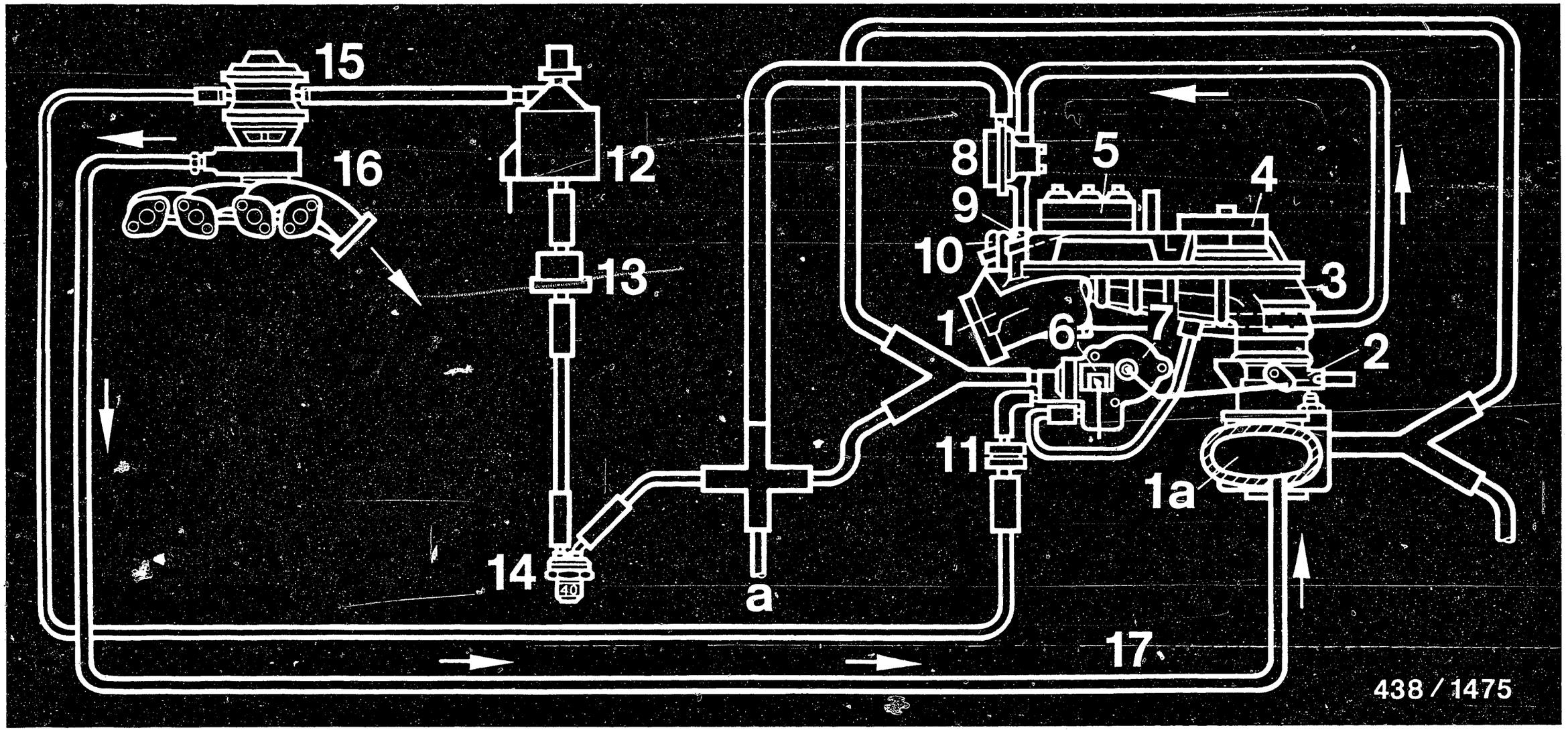
During the vacuum phases, the non-return valves open and fresh air flows into the exhaust manifold. This admixture of oxygen leads to post-combustion of incompletely-burned components in the exhaust, and thus to a reduction in harmful emissions. During overpressure phases, the non-return valves are closed.

Note: for idle adjustment (CO testing and adjustment), secondary-air self-induction remains operative.

Trouble-shooting in this system is limited to a visual check of all lines and connections.



1 = Intake-air filter
2 = Exhaust manifold
3 = Non-return valve



7.2 Exhaust-Gas Recirculation

● Representation of Principle of Exhaust-Gas Recirculation (EGR)

1 = Intake manifold upper section
1a = Intake manifold lower section
2 = Throttle-valve assembly
3 = Air guide housing
4 = Air-flow sensor
5 = Fuel distributor
6 = Throttle-valve switch
7 = Vacuum control valve
8 = Overrun bypass-air valve (only in vehicles with mechanical transmission)
9 = Molded hose
10 = Idle-air distributor
11 = Vacuum damper with restriction
12 = EGR solenoid-operated valve
13 = Vacuum non-return valve
14 = Thermo-valve +40°C
15 = EGR valve
16 = Exhaust manifold
17 = EGR line
a = Timing advance

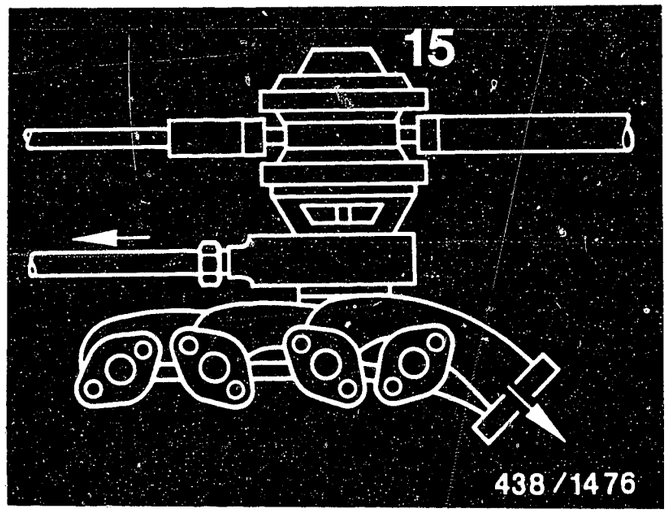
7.3 System Description

Under certain engine operating conditions, a part of the exhaust gases is returned to the air intake by exhaust-gas recirculation and undergoes combustion once again. The exhaust gas returned to the combustion chamber serves to lower peak combustion temperatures, thus causing a reduction in emissions of nitrogen oxides (NO_x)

Depending on the engine's operating condition, the recirculated exhaust quantity is varied or entirely supressed.

Exhaust-gas recirculation occurs:

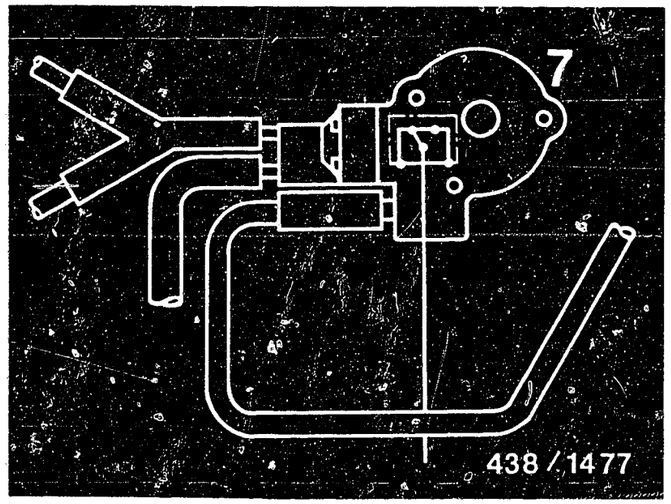
- Above an engine temperature of +40°C
- In the part-load range (throttle plate position approx. 4° over idle position to approx. 10° before full-load position.
- Within the part-load range, the exhaust gas quantity is determined depending on intake manifold vacuum and throttle plate position.



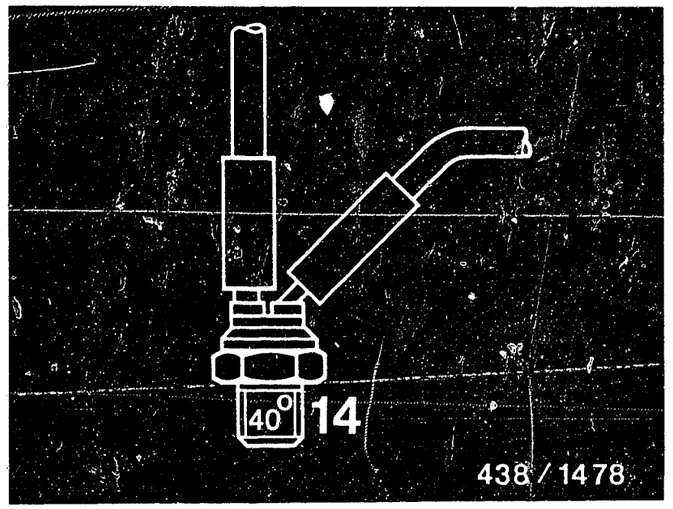
7.4 Description of Components:

The exhaust-gas-recirculation valve (EGR valve) (15) is flange-mounted on the exhaust manifold. It determines the amount of exhaust gases to be recirculated depending on the amount of vacuum.

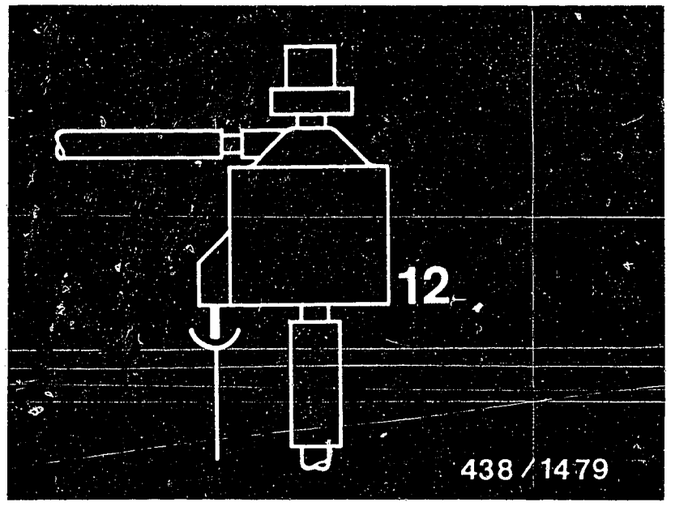
The vacuum control valve (7) forms a structural unit together with the throttle-valve assembly. The movement of the throttle plate is transmitted to the control valve via a rod. In accordance with the throttle plate position, the control valve determines the pressure present at the EGR valve and thus the exhaust-gas quantity recirculated.



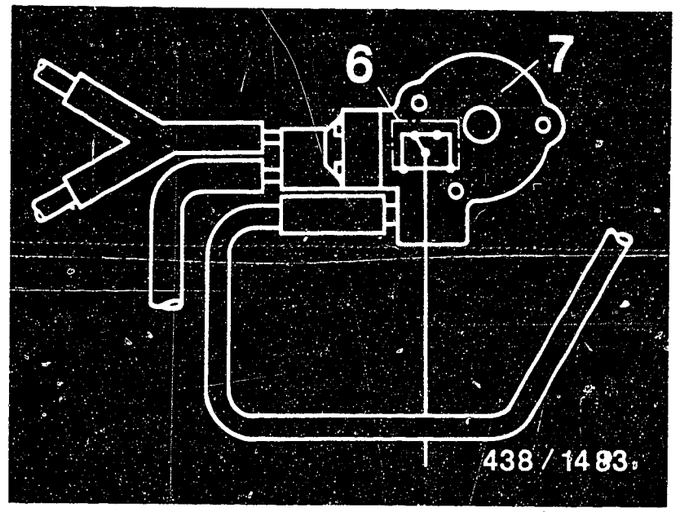
The thermo-valve (14) is built into the vacuum-actuation line to the EGR valve. It is closed at coolant temperatures under +40°C, permitting exhaust-gas recirculation only after this temperature has been exceeded.



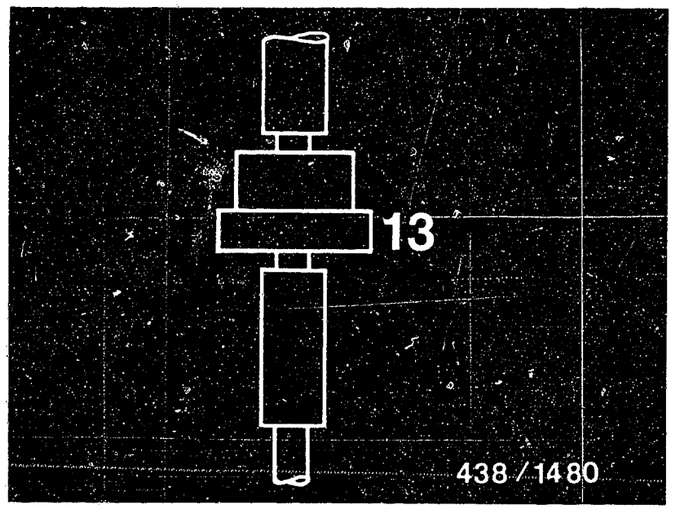
The EGR solenoid-operated valve (12) is likewise located in the vacuum-actuation line. Electric actuation is performed by the EGR control unit depending on throttle-plate position. When de-energized, vacuum flow is unrestricted. When energized, the valve switches to atmospheric aspiration, eliminating the vacuum to the EGR valve.



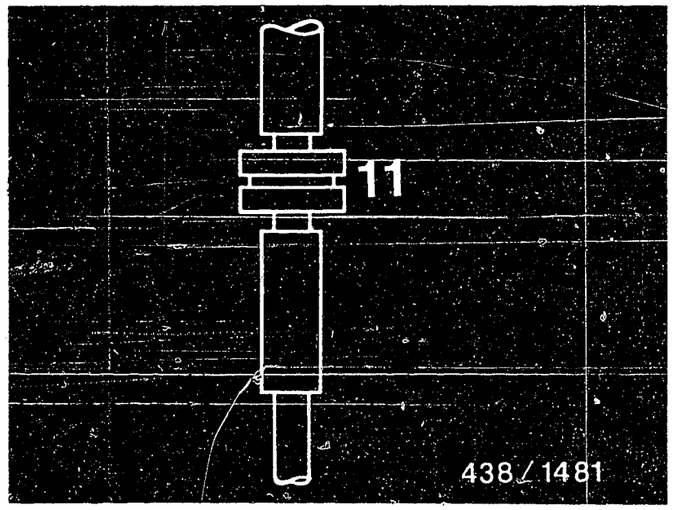
The idle / full-load throttle-valve switch (6) is attached to the vacuum control valve (7) and determines the switching operation of the EGR solenoid-operated valve via the EGR control unit. The idle contact is closed during idling and opens at approx. 4° throttle-plate opening. The full-load contact closes approx. 10° before full-load position.



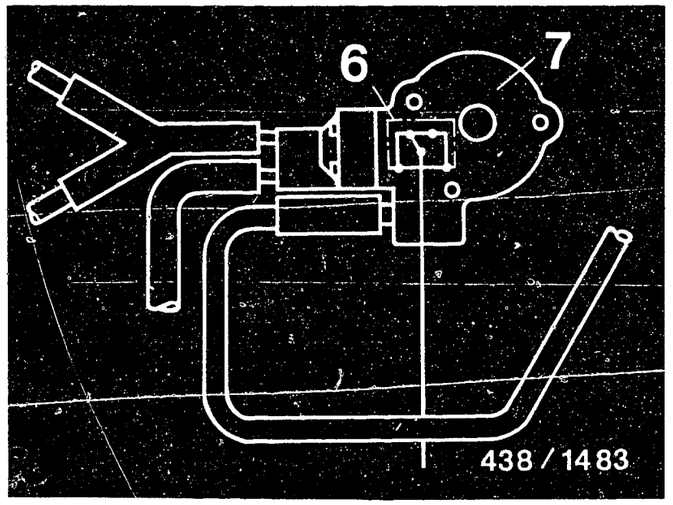
A non-return valve (13) in the vacuum-actuation line to the EGR valve ensures that the vacuum present at the EGR valve is maintained as the throttle-plate opening increases.



In an additional ventilation line from the vacuum control valve to the EGR valve is located a vacuum damper with restriction (11). This component dampens the switching of the EGR valve when the accelerator pedal is moved rapidly.



7.5 Testing Exhaust-Gas Recirculation



Note for Trouble-Shooting:
If a defect is located during one of the checks listed, after remedying the defect the test step should be repeated.

Test Step 1

Checking vacuum control valve (7):
Disconnect vacuum line (white/brown) from EGR valve. Connect vacuum tester (e.g. Mityvac vacuum pump) to line (white/brown). Idle engine. Vacuum specification value above 160 mbar.

Was this value obtained?

no → Replace vacuum control valve (7) complete with throttle-valve assembly, throttle-valve switch, and vacuum damper with restriction.

yes ↓

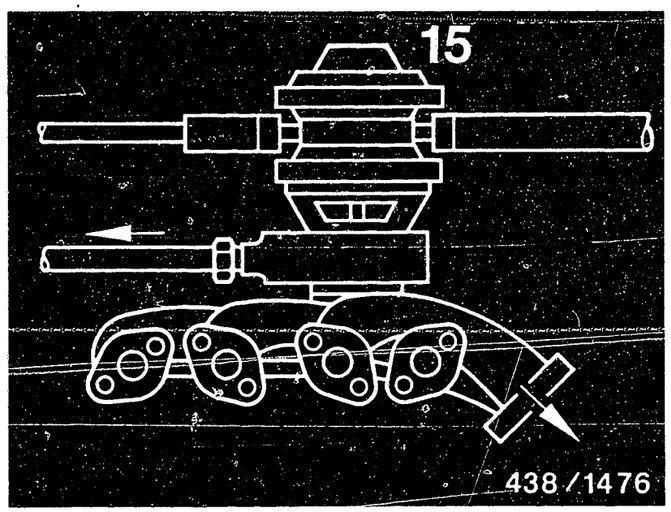
Test Step 2

Checking exhaust-gas recirculation operation:
Disconnect vacuum line (white/brown) from EGR valve (15). Start engine and slowly increase engine speed. Does the engine run irregularly or go out starting at approx. 1000 min^{-1}?

no → Continue testing from Test Step 3

yes ↓

End of test



Test Step 3

Checking vacuum lines:
Are vacuum lines correctly connected and sealed?

no → Check arrangement and sealing of vacuum lines for correspondence to Representation of Principle of EGR and remedy any defects.

yes ↓

Test Step 4

Checking exhaust-gas-recirculation valve (15):
Pull off both vacuum lines from EGR valve. Connect EGR valve (red connection) and triple distributor (arrow, upper illustration) by means of user-fabricated vacuum line.

Does idle speed decrease and does the engine run irregularly or go out?

no → Replace EGR valve.

yes ↓

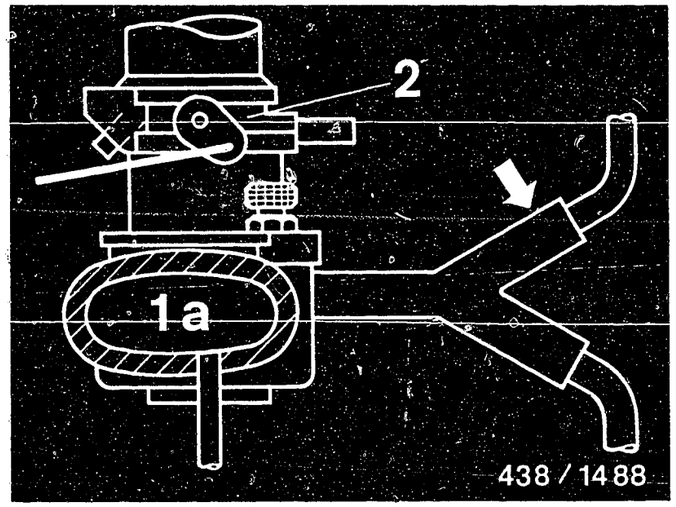
Test Step 5

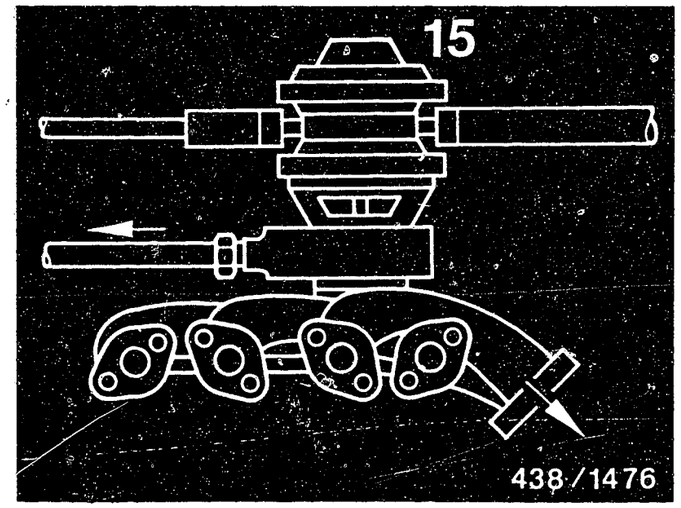
Checking non-return valve (13):
Check non-return valve with vacuum tester (e.g. Mityvac vacuum pump) for sealing (direction black → blue) and flow-through (direction blue → black).

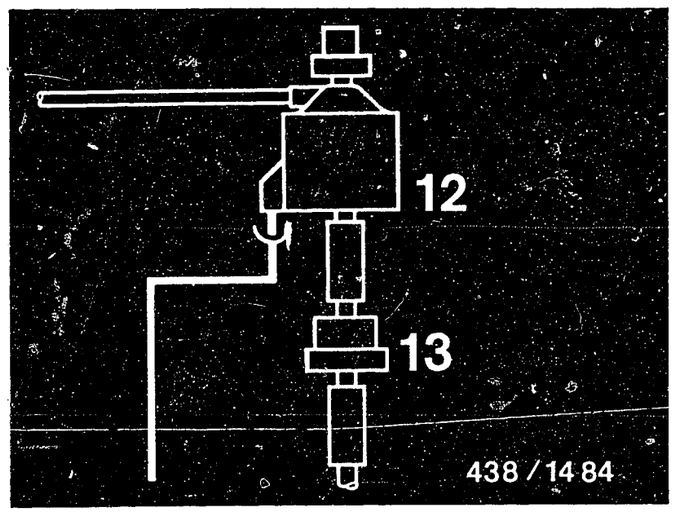
Does the non-return valve demonstrate sealing and flow-through in the indicated directions?

no → Replace non-return valve.

yes ↓







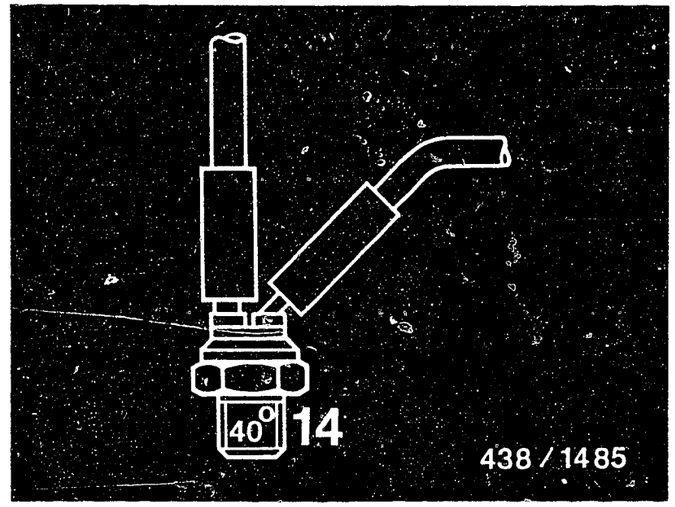
Test Step 6

Checking 40°C thermovlve:

Disconnect vacuum line (white/violet/brown) from straight connection on thermo-vave and connect vacuum tester (e.g. Mityvac vacuum pump to thermo-valve).
Start engine and warm up.

Is vacuum present?

no → Replace thermo-valve.



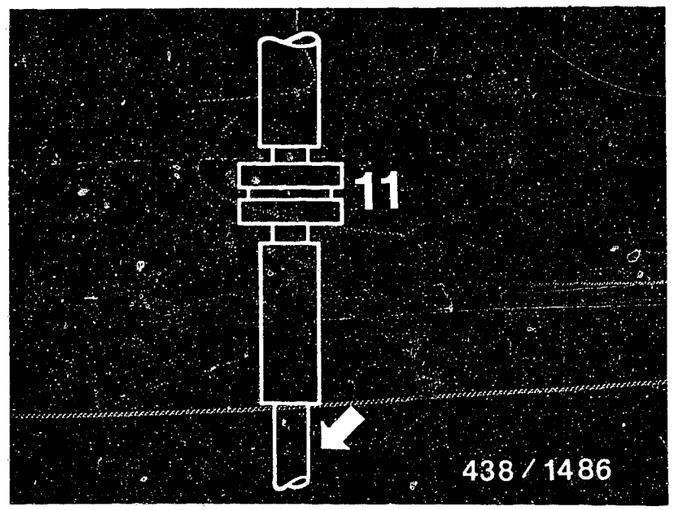
yes

Test Step 7

Checking vacuum damper (11) with restriction:
Start engine.
Disconnect vacuum line (white/brown, arrow)and connect vacuum tester (e.g. Mityvac vacuum pump) to vacuum damper.

Is vacuum present?

no → Check restriction for free flow-through, if necessary blow through.



yes

Test Step 8

Checking EGR control unit power supply:
Disconnect EGR control unit.

Connect voltmeter to socket 9 (positive) and socket 11 (ground).
Switch on ignition.

Is a voltage of 8 ... 15 V obtained?

no → Check positive lead (black) and ground lead per electrical terminal diagram.
Remedy defects.

yes ↓

Test Step 9

Checking cable set to solenoid-operated valve:
Disconnect EGR control unit. Connect sockets 9 and 3.
Disconnect coupling on EGR solenoid-operated valve and connect voltmeter.
Switch on ignition.

Is a voltage of 8 ... 15 V obtained?

no → Check positive lead (black) and ground lead per electrical terminal diagram.
Remedy defects.

yes ↓

Test Step 10

Checking EGR solenoid-operated valve:

While idling, disconnect and reconnect coupling on EGR solenoid-operated valve.

Does the EGR solenoid-operated valve switch discernibly

no → Replace EGR solenoid-operated valve.

yes ↓

Test Step 11

Checking cable set to throttle-valve switch:
Disconnect control unit. Take apart triple plug (near mixture-control unit) between throttle-valve switch and EGR unit.
Switch on ignition.

a) Connect sockets 1 and 2 of triple line plug. Connect voltmeter at sockets 10 (positive) and 11 (ground) of EGR control unit base.
Specification value 8 ... 18 V.

b) Connect sockets 2 and 3 of triple plug. Connect voltmeter at sockets 8 (positive) and 11 (ground) of EGR control unit base.
Specification value 8 ... 15 V.

Were both specified voltage values obtained?

no → Check cable set to throttle-valve switch per electrical terminal diagram.
Remedy defects.

yes ↓

Test Step 12

Checking throttle-valve switch:
Take apart triple plug (near mixture-control unit) between throttle-valve switch and EGR control unit.

a) Connect ohmmeter at pins 1 and 2.
Specification resistance, throttle plate closed: 0 ... 1 Ω.

Specification resistance, throttle plate in part load position: ∞Ω.
Switching point: distance from throttle-plate lever to stop screw = 1 ... 1.3 mm.

b) Connect ohmmeter at pins 2 and 3.
Specification resistance, throttle plate fully open: 0 ... 1 Ω.

Are measured values and switching point OK?

no → Adjust throttle-valve switch by rotating in area of fastening bolt slots, or replace defective throttle-valve switch.

yes ↓

Test Step 13

Checking EGR control unit:
Disconnect coupling on EGR solenoid-operated valve. Connect voltmeter at coupling.
Switch on ignition.
Throttle plate closed / fully open:
Specification value 8 ... 15 V.
Throttle plate slightly open:
Specification value 0 V:
Were specification voltages obtained?

no → Replace AGR control unit.

yes ↓

End of test

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